Bayshore Watershed
Sediment Control
Final Report

November 2007

Presented to:

The Wawasee Area Conservancy Foundation
PO Box 548
Syracuse, IN 46567

and the
Lake and River Enhancement Program
Indiana Department of Natural Resources - Div. of Fish and Wildlife
1353 S Governors Drive
Columbia City, IN 46725

by

JFNew
708 Roosevelt Road
Walkerton, IN 46574

BAYSHORE WATERSHED SEDIMENT CONTROL PROJECT
FINAL REPORT
KOSCIUSKO COUNTY, INDIANA

1.0 PROJECT DESCRIPTION AND PURPOSE

The Bayshore project area is named after an embayment at the south end of Lake Wawasee in Kosciusko County, Indiana (Figure 1). The Bayshore area accepts drainage off approximately 105 acres of primarily agricultural ground (Figure 2). The drainage begins as ephemeral flows off agricultural fields and becomes a permanently flowing channel after passing under 850 East Road through a 24-inch diameter culvert. From there the channel meanders through a wetland area and through another culvert under a residential property and Hatchery Road before emptying into a channel of Lake Wawasee approximately 380 feet east of 850 East Road. The total channel length including the ephemeral grassed waterways is approximately 3,700 feet.

The project intercepts the drainage prior to 850 East Road, as it turns from an ephemeral flow into an intermittent flow and filters it through a series of restored wetlands and existing open water ponds in an attempt to significantly reduce the sediment loading to the Bayshore channel. The purpose of the project is to trap sediment coming from the upper watershed and allow the majority of the sediment to be removed and to be disposed before it reaches Lake Wawasee. In addition to this project, our recommendation to Wawasee Area Conservancy Foundation (WACF) was to work with the existing landowner in the upper watershed to enroll the agricultural fields in the Conservation Reserve Program. Alternatively, WACF should pursue the purchase or long term lease of the agricultural fields above the ponds and wetlands and restore them to grass or trees. Following this recommendation would eliminate the need for long-term maintenance on the proposed project.

Figure 1. Bayshore project location map Kosciusko, Indiana.

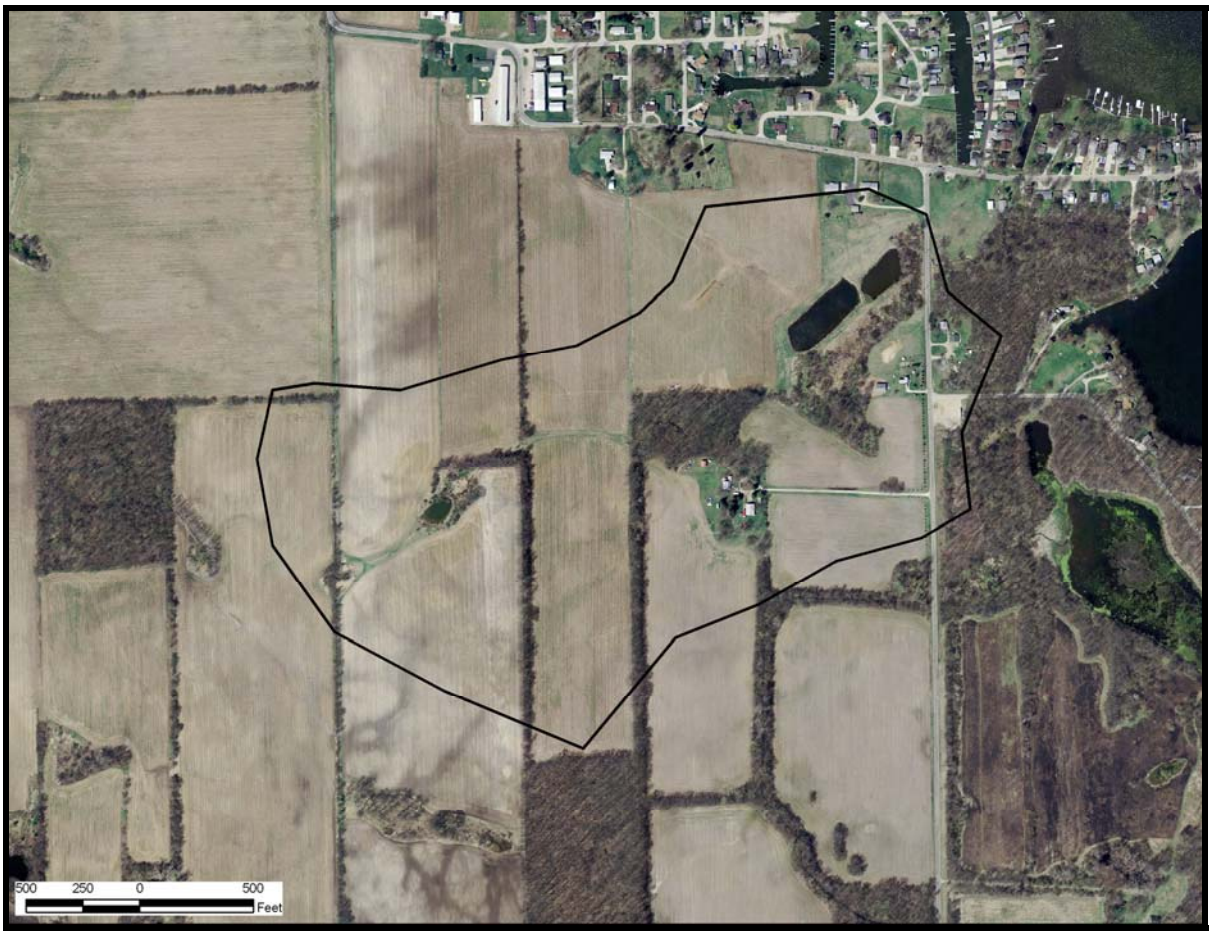


Figure 2. Bayshore project area drainage area of approximately 105 acres.

2.0 STATEMENT OF THE PROBLEM

The Bayshore area of Lake Wawasee has reportedly received heavy loads of sediments for many years, prompting the feasibility study. HARZA (2001) reported that approximately 3 tons of sediment was generated from the 74 acres of agricultural fields draining to the Bayshore wetlands during each 2-year storm event. The same size storm event generated approximately 19 cubic feet per second flow according to HARZA's calculations. The source of the sediments are the agricultural fields in the upper watershed consisting of Crosier loam, Metea loamy sand, Riddles fine sandy loam, and a complex of Riddles, Ormas and Kosciusko sandy loams ranging from 1 to12 percent slopes (Figure 3). Twelve percent slopes on any of these soils are highly erodible.

Narrow grassed waterways (approximately 2-3 meters wide) have been established in the upper fields which then lead to a wooded ravine. The ravine empties into a wetland complex west of 850 East Road onto property recently purchased by the WACF. Prior to the WACF purchase of approximately 8-acres at the southwest corner of 850 East and Hatchery Road, two ponds were constructed in the wetland (estimated construction date late 1970's). The spoils from the pond construction were spread into wetlands adjacent to the ponds. HARZA (2001) targeted the

wetlands and ponds west of 850 East Road as a potential sediment trap/detention area to treat the sediment coming from the fields. The proposed project was unacceptable to the landowners. Subsequently, WACF acquired the property including the ponds and the majority of the remaining wetland, to allow the proposed project to be implemented.

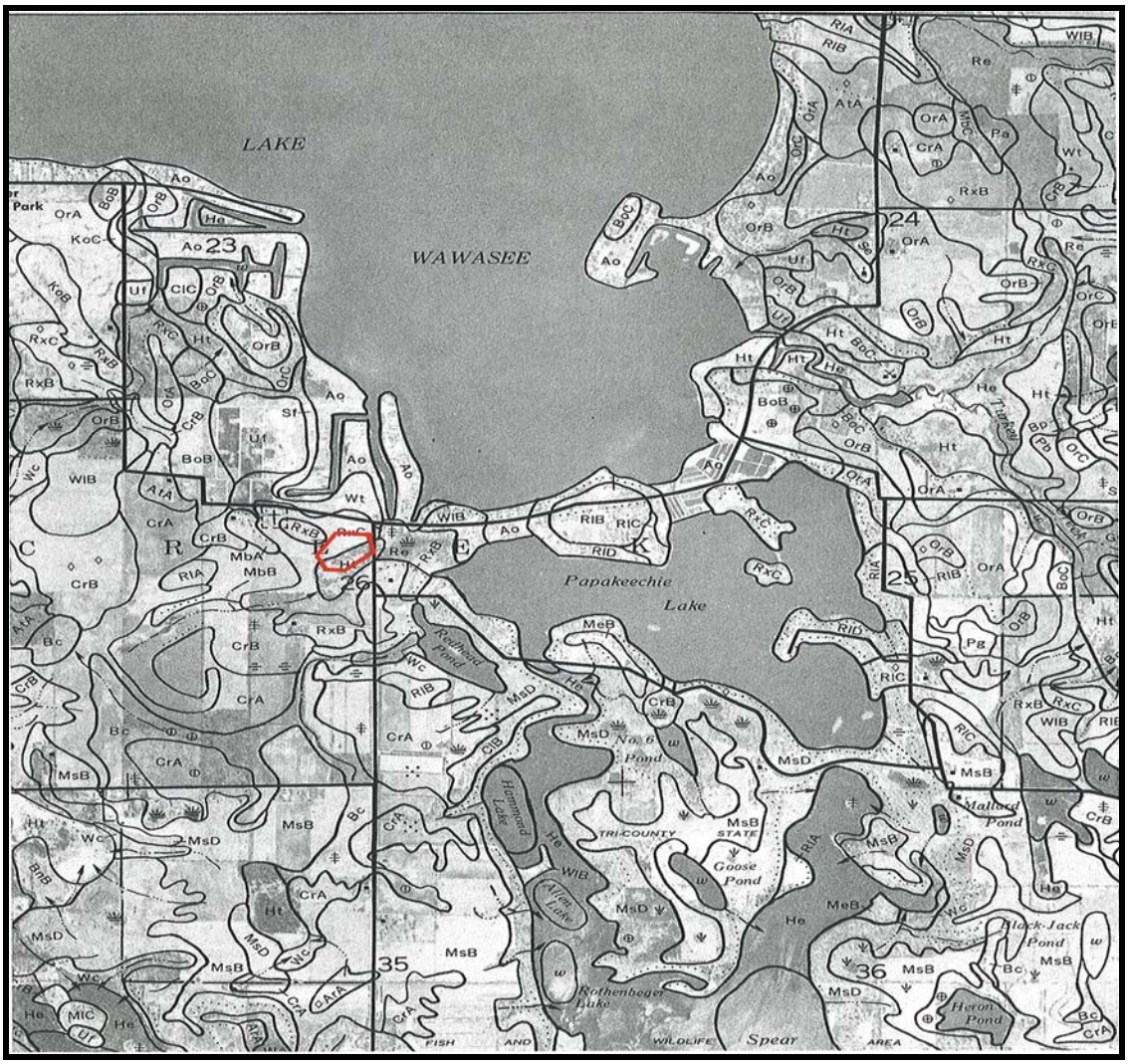


Figure 3. Soils map of the Bayshore watershed.

3.0 DESIGN RATIONALE

A group consisting of WACF members, Indiana Department of Natural Resources (IDNR) Lake and River Enhancement (LARE) staff, and JFNew met on site to generate ideas and a general plan agreeable to all parties at the beginning of the project. Based on the general principal that a reduction in velocity of flowing water will cause sediment to drop out of suspension, the group came up with a four step treatment system that included a forebay/sediment trap at the southwest corner of the western pond, a vegetated first pond, a restored wetland filter, and then the final eastern pond acting as a polishing pond for ultra fine sediments. The resulting treatment train would allow for heavy sediments like sand to be removed in a smaller, accessible sediment trap;

that could be easily maintained, while preserving the majority of the existing ponds, and restoring some of the filled wetlands for esthetics, ecological, and educational purposes.

Based on regulatory agency feedback during the permitting process; the design was modified to reduce fill in wetland areas by eliminating the berm which guided the ephemeral stream into the treatment system. Instead of the berm guiding the path of the water; we chose to excavate a swale into the partially filled wetland area that will pull the water from the ephemeral stream into the sediment trap. From the sediment trap, a rock spillway leads the water into the remainder of the western-most pond. The spillway increases the water velocity again, before allowing it to spread out into the existing pond vegetated with emergent wetland plants around its outer edge. Water from this pond was designed to be guided through another rock spillway into a restored emergent wetland to filter nutrients and catch fine particles that migrate from the pond. Finally, the water was planned to be passed through the existing eastern-most pond. This second pond will remain as it currently exists, without vegetation.

4.0 DESIGN AND CONSTRUCTION SPECIFICS

4.1 Wetland Restoration

The proposed final plan includes two wetland restoration areas (Appendix A). These areas were once part of the existing wetland complex but were filled with one to three feet of soil when the ponds were constructed. The first area is located at the west end of the property. It is dominated by the invasive reed canary grass and consists of muck fill and eroded sediments over the original grade. The second area of proposed restoration is the grass field adjacent to the eastern-most pond. The area is currently dominated by the invasive reed canary grass but shows signs of its previous wetland status with lake sedge beginning to gain a foothold through the fill. These areas were stripped of fill material to at or near the original grades and replanted with a wet prairie mix (Appendix A, sheet 5 of 5). The western most restoration area follows the grade of the existing topography and drains into the proposed sediment trap. The eastern wetland restoration area has a grade elevation of 860.5 and drain through a rock spillway into the adjacent pond at an elevation of 860.0.

4.2 Sediment Trap

The sediment trap was constructed at the west end of the western-most pond. The sediment trap was constructed to a depth of 8 feet in the center having 2:1 side slopes and extending to a maximum width of 40 feet and a maximum length of 80 feet. The spillway into the pond consists of rock revetment riprap having a crest elevation of 862.5. The basin is expected to trap sand from the ephemeral flow of the waterway. A grassed waterway was designed to intercept the ephemeral flow of water in the drainage and guide it to the sediment trap. The grassed waterway is designed to carry 20 cubic feet per second during the 2-year event based on Harza (2001) calculations. Flows exceeding the 2-year discharge will flood into the adjacent restored wetland and be guided into the sediment trap as well.

4.3 Spillways

There are three potential spillways built into the project. The first is the rock spillway from the sediment trap into the western-most pond. This structure was designed to hold water 6 inches higher in the sediment trap then the receiving pond at design elevation of 862.5. The second is the rock spillway from the western pond into the wetland. This structure has a design elevation of 862.0 and holds the water one foot above the design elevation of the restored wetland. The proposed spillway from the wetland to the final pond has a planned crest elevation of 861.0. Each spillway is constructed of revetment riprap on non-woven filter fabric to prevent settling.

4.4 Landowner Agreement

The project was designed within property that is currently owned by the project sponsor (WACF) and thus no specific owner permission was required for the project to proceed.

4.5 Permitting

Permit applications were submitted to the U.S. Army Corps of Engineers and the Indiana Department of Environmental Management. Permits were obtained and can be found in Appendix B.

4.6 Related Project Activities and Logistics

This project was funded by a LARE grant to WACF for a project to reduce sediment loads from Bayshore watershed to Lake Wawasee. Upon completion of the design report it was understood that WACF had already obtained funds for the construction of the project based on initial estimates by HARZA (2001).

4.7 Estimates of Probable Cost

The $51,234 estimate below was based on 2007 labor and materials costs with input by a local contractor. Bids received ranged from $38,410 to $41,584 not including construction administration and oversight. Stanger Excavating was selected to construct the project with a bid of $38,718. Construction oversight was completed on a time and materials basis and included the update of this report at a cost of approximately 3,500.00. The total cost of the project construction was therefore, $42,218.00.

Table 1. Preliminary Estimates of probable cost.

Description of Work Item	Unit of Measure	#of Units	Unit Cost	Total
Mobilization/Demobilization	each	2	$2,000	$4,000
Earth work	Cubic yard	1700	$6.00	$10,200
Spillway construction	Cubic yard	250	$40.00	$10,000
Temporary Erosion Control	Square yard	14,000	$0.25	$3,500
Final seeding	Square yard	14,000	$0.50	$7,000
Blanketing	Square yard	960	$3.50	$3,360
Plug or tuber Planting	each	450	$3.00	$1,350
Subtotal				**$39,410**
Construction contingency	15% of construction costs	1	$5,709	$5,912
Construction Management	15% of construction costs	1	$5,709	$5,912
Total				**$51,234**

5.0 CONSTRUCTION SCHEDULE

The project is proposed to proceed in summer of 2007 with completion by September of 2007. Actual construction began the first week in August and was completed within three weeks.

6.0 MONITORING AND MAINTENANCE ACTIVITY

The project site should be monitored after one full growing season and one a year after that. Monitoring should consist of checking on the growth of vegetation throughout the site, including the emergent wetland plantings in the pond. Ideally, a botanist would conduct transect or quadrat monitoring to record the percent cover of each species present. However, to save funds, monitoring could consist of just noting the dominant plant species present and the overall percent coverage. If the percent coverage is not greater than 50 percent in all planted areas during the first growing season then the areas should be reseeded or replanted to establish better cover. After two or more growing seasons at least 80 percent of the ground surface should be obscured by vegetation.

The spillways should be inspected annually for displacement of rock. If any portions of the spillways have been lowered (as evidenced by adjacent rock or exposed filter fabric) those areas should be repaired by replacing the missing rock with rock of larger diameter. Areas adjacent to spillways (especially the strip of ground between the two ponds) should be examined for muskrat damage. If the ponds are connected by burrows, some of the nutrient filtering capacity of the treatment train will be lost. The muskrats, if present and causing damage, should be removed by a professional trapper.

An inspection of the sediment trap should be conducted every two to three years to determine maintenance cleaning needs. This can be determined by measuring the depth of the sediment trap based on the depths shown in the construction drawings or by using a graduated PVC pipe to measure the depth of accumulated sediments in the bottom of the pond. After sediment fills more than 1/3 of the depth of the sediment trap, arrangements should be made to have the trap cleaned. Material obtained from trap maintenance will be suitable for redistribution on farm fields or adjacent lawn areas.

Prairie development on the slopes and around the pond edges will take three to five years after seeding to be fully established. During the first three years the areas should be mown or burned annually to reduce herbaceous weeds, shrubs, and trees. Supplemental seeding with annuals is acceptable to increase esthetics during these first few years. After five years the plants should be mature and bloom times of various forbs should be evident throughout the growing season.

7.0 PROJECT SUMMARY

Sediment flowing to Lake Wawasee from Bayshore is derived from upper watershed surface erosion. Approximately 75 acres of tilled agricultural land drain into the Bayshore wetlands out of a total of 105 acres in the watershed. The original concept plan for this project was to construct a barrier along 850 East Road to trap sediment in the existing wetland area and utilize this area for detention. The revised plans reduced the scope to allow the project to be permitted and allow for simplified maintenance, wetland preservation, and an educational setting. The current plan includes a four-step sediment and nutrient removal process, yet ultimately, clean water depends upon reducing sediment from the agricultural fields in the upper watershed through conversion to grassland or reforestation.

The four step sediment removal process designed includes a sediment trap that can be accessed and cleaned of heavier particles, a second settling pond for finer material, a tertiary restored wetland filter, and finally a finishing pond for removing suspended sediments, if any. The design is based on the fact that alternately speeding up and slowing down water and running it through vegetated filters will remove most particulate matter.

8.0 REFERENCE

HARZA Engineering Company. 2001. Lake Wawasee Engineering Feasibility Study. Prepared for the Wawasee Area Conservancy Foundation. Funded by Indiana Department of Natural Resources Lake and River Enhancement Program. 97 pp.

APPENDIX A

DESIGN PLANS

JFNew
http://www.jfnew.com

Corporate Office
708 Roosevelt Road
Walkerton, Indiana 46574
574-586-3400 fax 574-586-3446

Ohio Office
8080 Beckett Center Dr., Suite 226
West Chester, Ohio 45069
513-942-3446 fax 513-942-3447

Illinois Office
1378 Main Street
Crete, Illinois 60417
708-367-1130 fax 708-367-1132

Indianapolis Office
6640 Parkdale Place, Suite S
Indianapolis, Indiana 46254
317-388-1982 fax 317-388-1986

Michigan Office
600 South Beacon
Grand Haven, Michigan 49417
616-847-1680 fax 616-847-9970

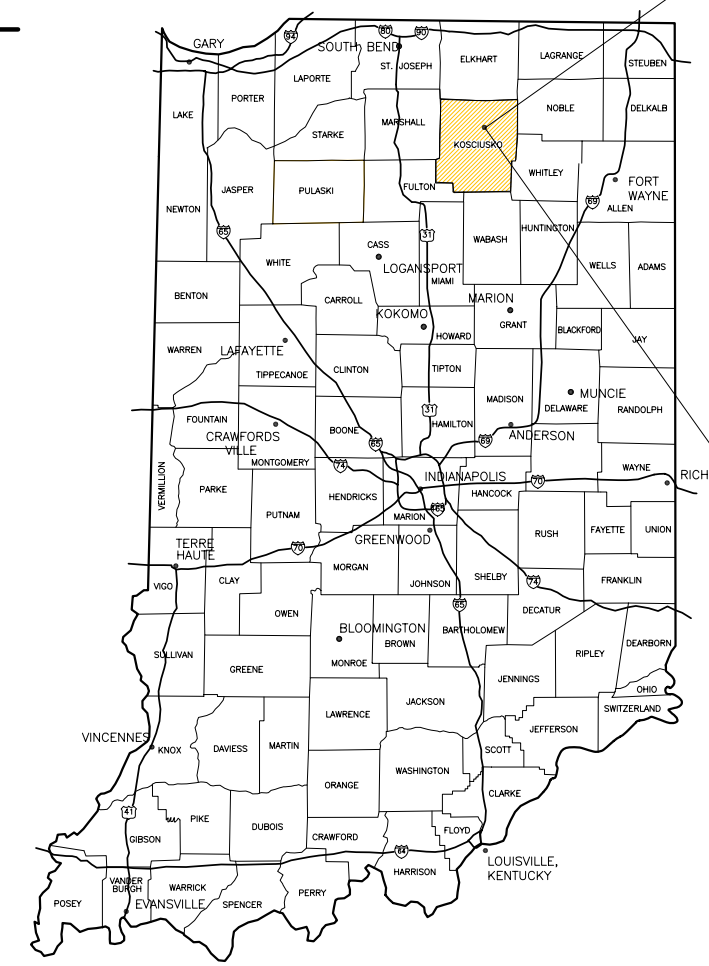
Wisconsin Office
1402 Pankratz Street, Suite 302
Madison, Wisconsin 53704
608-240-1453

BAYSHORE LARE PROJECT

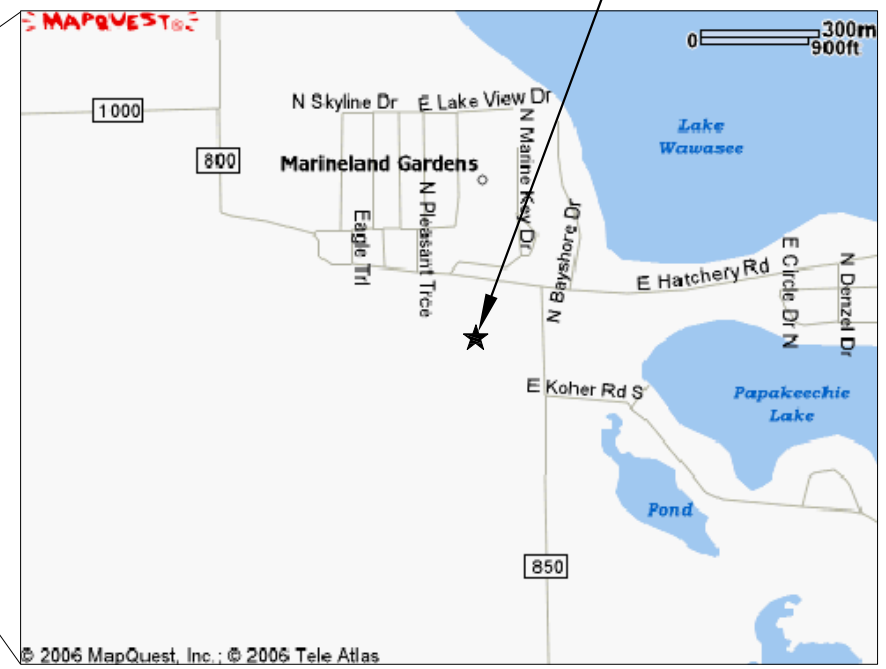
WAWASEE AREA CONSERVANCY DISTRICT

KOSCIUSKO COUNTY, INDIANA
APRIL 2007 CONSTRUCTION PLANS

SHEET INDEX



PROJECT LOCATION



VICINITY MAP

N

Our mission is to provide the highest quality environmental services to our clients while positively impacting the lives of our employees and the conservation of natural resources through prosperity and stewardship.

REVISION

BAYSHORE WETLAND IMPROVEMENT

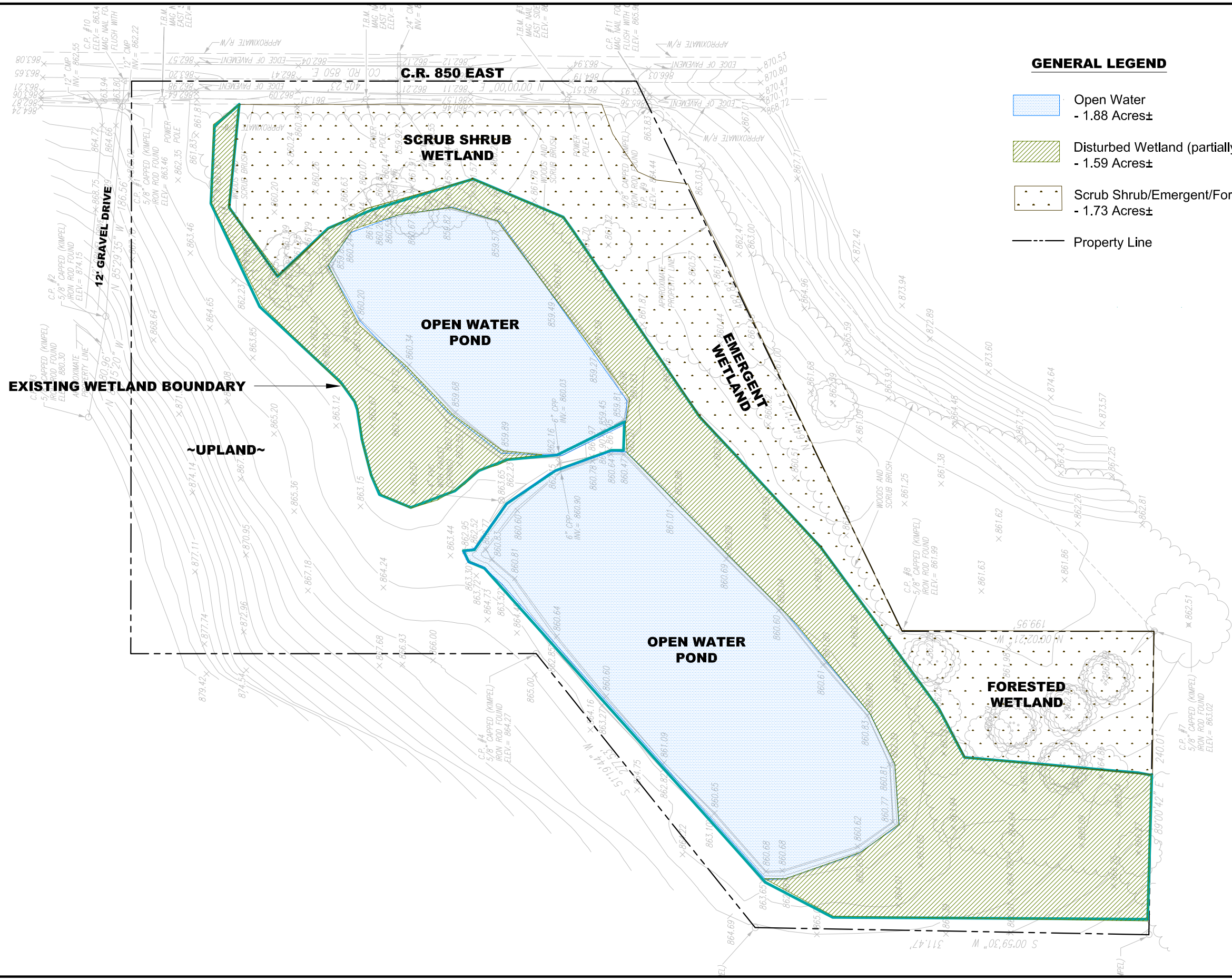
COVER SHEET

DRAWN BY:	COD
DESIGNED BY:	JBR
DATE:	16APR07
JOB NO:	030737

DRAWING NO.

1

OF 5



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0 40'

SCALE IN FEET

GRAPHIC SCALE VERIFICATION
This bar measures 1" on 22"x34" or 1/2" on 11"x17" original. Adjust scale accordingly.

JFNew
Corporate Office
708 Roosevelt Road
Walkerton, Indiana 46574
574-586-3400

Indianapolis Office
6640 Parkdale Place, Suite S
Indianapolis, Indiana 46254
317-388-1982

REVISION	
A	08JAN07 DEFINED WETLAND AREAS

BAYSHORE
WAWASEE AREA CONSERVANCY DISTRICT
WETLAND ENHANCEMENT PROJECT
EXISTING SITE PLAN

DRAWN BY:	COD
DESIGNED BY:	JBR
DATE:	16APR07
JOB NO:	030737

DRAWING NO.

2

OF 5

C.R. 850 EAST

CONSTRUCTION ACCESS (GRAVEL)

DISPOSAL AREA FOR EXCESS EARTH

12' GRAVEL DRIVE

EXISTING POND ELEV. 860.1 TO 860.5 (TO REMAIN UNCHANGED)

EXISTING OPEN WATER POND

WETLAND ENHANCEMENT AREA

I.E. 860.5

PROPOSED WETLAND MAX. WATER ELEV. 861.0

ROCK SPILLWAY AND WATER CONTROL STRUCTURE (2/4)

CONTOURS TO REMAIN UNCHANGED

× 852.9 EXISTING OPEN WATER POND

PROPOSED TOP OF WATER ELEV. 862.0

EXISTING WATER ELEV. 860±

PROPOSED TOP OF WATER ELEV. 863.0

GRADE REMAINS THE SAME THIS AREA

This structure was relocated back to its originally designed position during construction

PROPOSED ROCK SPILLWAY ELEV. 862.5 SEE DETAIL (3/4)

PROPOSED SEDIMENT TRAP 8' DEPTH

862.5 AT ENTRANCE TO TRAP

863.5

864.5

866.5

GRASSED WATERWAY EXCAVATE 18" BELOW EXISTING GRADE IN CENTER OF WATERWAY

EXCAVATE APPROXIMATELY 6" BELOW EXISTING GRADE

GENERAL LEGEND

Property Line

N

0 40'

SCALE IN FEET

GRAPHIC SCALE VERIFICATION
This bar measures 1" on 22"x34" or 1/2" on 11"x17" original. Adjust scale accordingly.

JFNew
Corporate Office
708 Roosevelt Road
Walkerton, Indiana 46574
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REVISION

BAYSHORE
WAWASEE AREA CONSERVANCY DISTRICT
WETLAND ENHANCEMENT PROJECT
PROPOSED SITE PLAN

DRAWN BY:	COD
DESIGNED BY:	JBR
DATE:	16APR07
JOB NO:	030737

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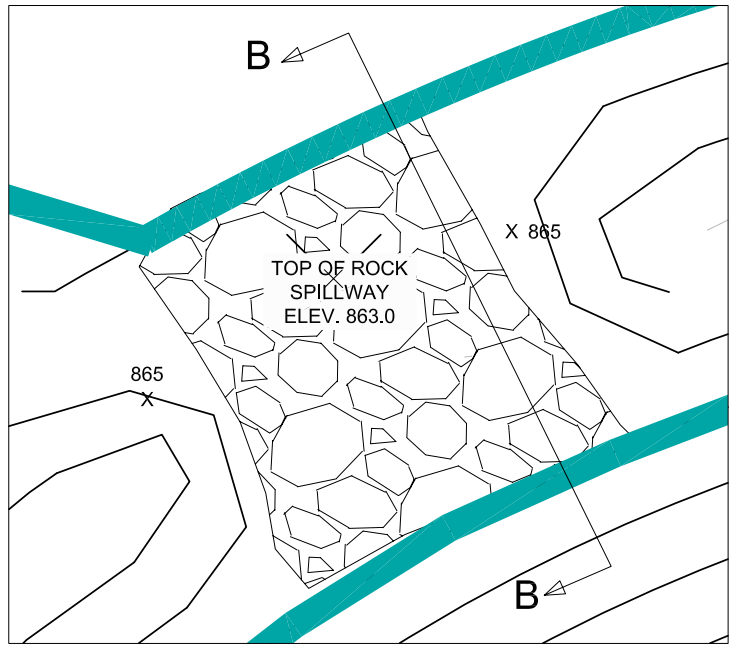
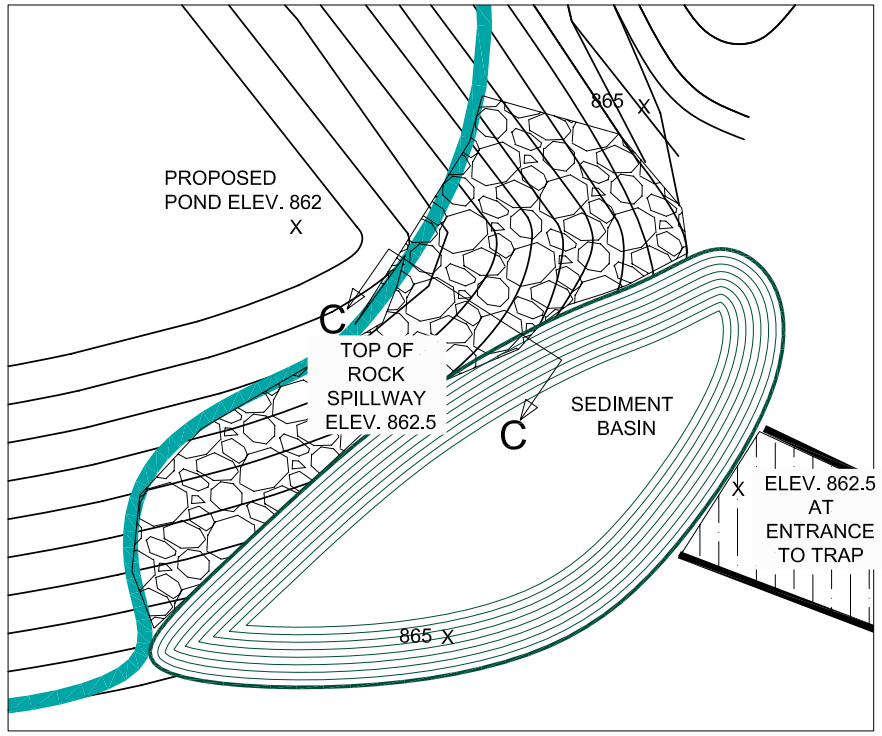
3

OF 5



2/4 ROCK SPILLWAY – DETAIL
0 10'



3/4 ROCK SPILLWAY – DETAIL
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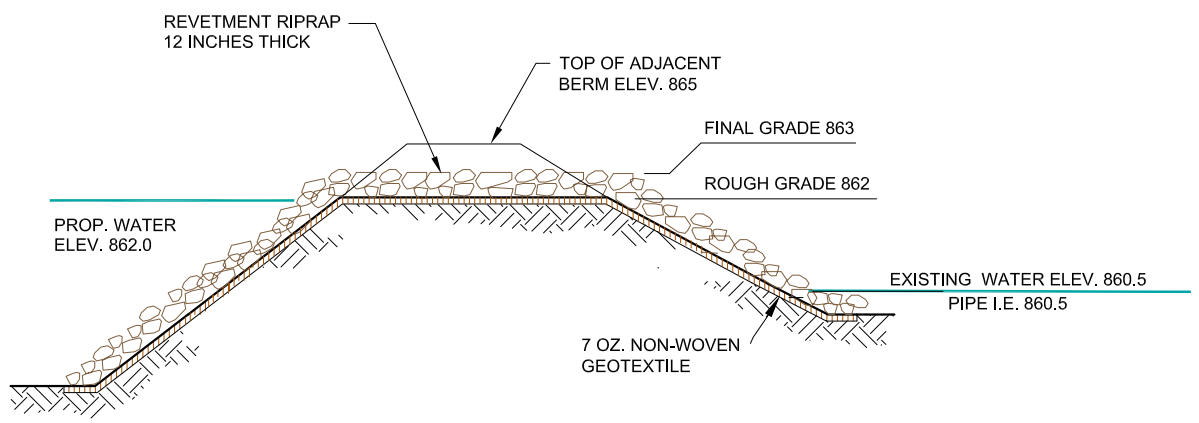
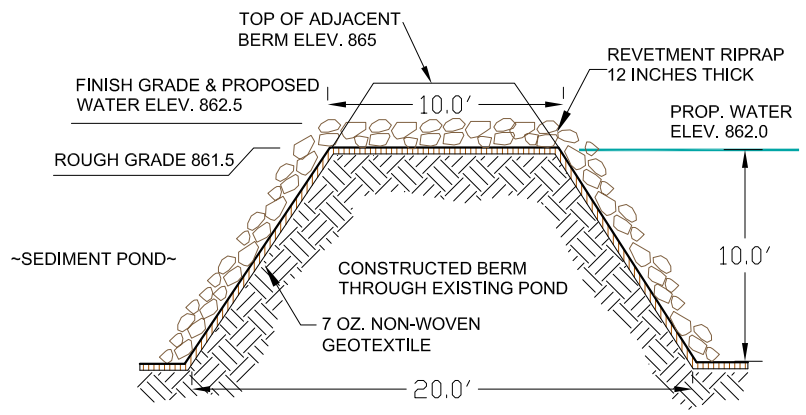


B/4 ROCK SPILLWAY – DETAIL
NOT TO SCALE



C/4 ROCK SPILLWAY – DETAIL
NOT TO SCALE

0 40'
SCALE IN FEET

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REVISION

BAYSHORE
WAWASEE AREA CONSERVANCY DISTRICT
WETLAND ENHANCEMENT PROJECT
MISCELLANEOUS DETAILS

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DATE:	16APR07
JOB NO:	030737

DRAWING NO.
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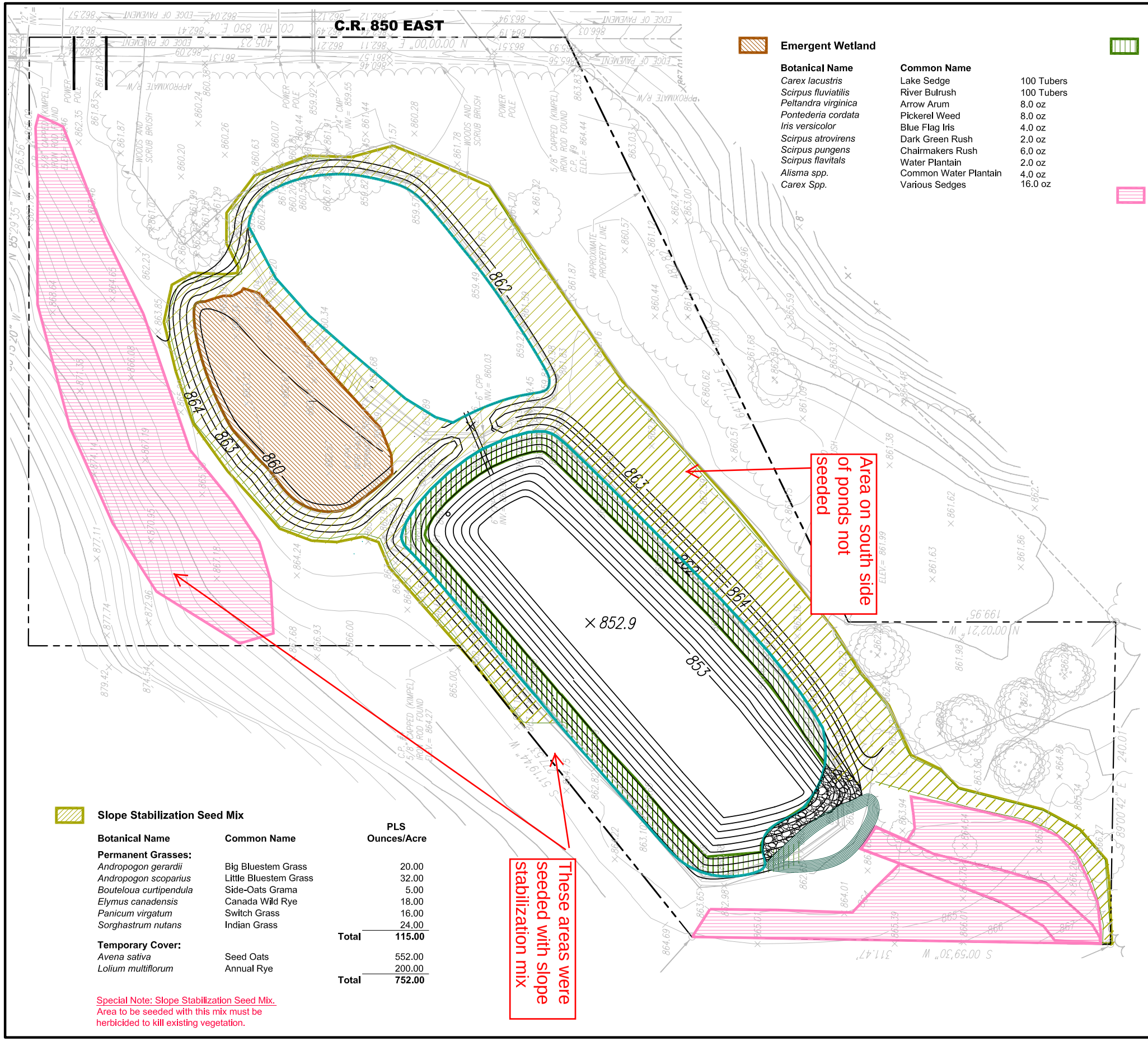
OF 5



Emergent Wetland

Botanical Name	Common Name	
Carex lacustris	Lake Sedge	100 Tubers
Scirpus fluviatilis	River Bulrush	100 Tubers
Peltandra virginica	Arrow Arum	8.0 oz
Pontederia cordata	Pickerel Weed	8.0 oz
Iris versicolor	Blue Flag Iris	4.0 oz
Scirpus atrovirens	Dark Green Rush	2.0 oz
Scirpus pungens	Chairmakers Rush	6.0 oz
Scirpus flavitals	Water Plantain	2.0 oz
Alisma spp.	Common Water Plantain	4.0 oz
Carex Spp.	Various Sedges	16.0 oz

Pond Edge

Botanical Name	Common Name	Tubers
Nuphar luteum	Spatterdock	200 Tubers
Pontederia cordata	Pickerel Weed	8.0 oz
Potamogeton natans	Common Pondweed	18 Plugs
Potamogeton pectinatus	Sago Pondweed	18 Plugs
Sagittaria latifolia	Common Arrowhead	8.0 oz
Polygonum pensylvanicum	Pinkweed	8.0 oz
Peltandra virginica	Arrow Arum	8.0 oz

Wet-to-Mesic Prairie/Meadow Seed Mix

Botanical Name	Common Name	PLS Ounces/Acre
Permanent Grasses:		
Andropogon gerardii	Big Blue Stem	65.25
Calamagrostis canadensis	Blue Joint Grass	4.50
Carex frankii	Franks Sedge	1.00
Elymus canadensis	Prairie Wild Rye	16.00
Panicum virgatum	Prairie Switch Grass	1.50
Scirpus pendulus	Red Bulrush	0.75
Sorghastrum nutans	Indian Grass	6.00
Spartina pectinata	Prairie Cord Grass	5.00
	Total	**100.00**
Temporary Cover:		
Avena sativa	Seed Oats	360.00
Lolium multiflorum	Annual Rye	124.00
	Total	**484.00**
Forbs:		
Aster novae-angliae	New England Aster	1.50
Baptisia leucantha	White Wild Indigo	1.50
Cassia fasciculata	Partridge Pea	4.25
Coreopsis tripteris	Tall Coreopsis	1.25
Desmodium illinoiense	Illinois Tick Trefoil	1.00
Eryngium yuccifolium	Rattlesnake Master	3.00
Filupendula rubra	Queen of the Prairie	0.25
Gentiana andrewsii	Bottle Gentian	0.50
Helenium autumnale	SneezeWeed	1.75
Helianthus grosseserratus	Saw-Tooth Sunflower	2.00
Lespedeza capitata	Round-Headed Bush Clover	3.00
Liatris spicata	Marsh Blazing Star	4.00
Monarda fistulosa	Prairie Bergamot	0.75
Parthenium integrifolium	Wild Quinine	2.50
Physostegia virginiana	False Dragonhead	1.50
Pycnanthemum virginianum	Virginia Mountain Mint	0.75
Ratibida pinnata	Yellow Coneflower	3.50
Rudbeckia hirta	Black-Eyed Susan	2.50
Rudbeckia laciniata	Cut-Leaf Coneflower	2.00
Rudbeckia subtomentosa	Sweet Black-Eyed Susan	1.25
Silphium integrifolium	Rosin Weed	2.00
Silphium laciniatum	Compass Plant	3.00
Silphium perfoliatum	Cup Plant	3.00
Silphium terebinthinaceum	Prairie Dock	2.00
Solidago juncea	Early Goldenrod	2.00
Solidago rigida	Stiff Goldenrod	2.00
Solidago rugosa	Rough Goldenrod	2.50
Tradescantia ohioensis	Common Spiderwort	1.25
Vernonia altissima taeniotricha	IronWeed	3.00
Veronicastrum virginiacum	Culvers Root	0.50
Zizia aurea	Golden Alexanders	0.50
	Total	**60.50**
Annual/Perennial Forbs Mix		**32.00**

Slope Stabilization Seed Mix

Botanical Name	Common Name	PLS Ounces/Acre
Permanent Grasses:		
Andropogon gerardii	Big Bluestem Grass	20.00
Andropogon scoparius	Little Bluestem Grass	32.00
Bouteloua curtipendula	Side-Oats Grama	5.00
Elymus canadensis	Canada Wild Rye	18.00
Panicum virgatum	Switch Grass	16.00
Sorghastrum nutans	Indian Grass	24.00
	Total	**115.00**
Temporary Cover:		
Avena sativa	Seed Oats	552.00
Lolium multiflorum	Annual Rye	200.00
	Total	**752.00**

Special Note: Slope Stabilization Seed Mix.
Area to be seeded with this mix must be herbicided to kill existing vegetation.

GENERAL LEGEND

Property Line

N

0 40'

SCALE IN FEET

GRAPHIC SCALE VERIFICATION
This bar measures 1" on 22"x34" or 1/2" on 11"x17" original. Adjust scale accordingly.

JFNew
Corporate Office
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Indianapolis, Indiana 46254
317-388-1982

REVISION

BAYSHORE
WAWASEE AREA CONSERVANCY DISTRICT
WETLAND ENHANCEMENT PROJECT
PLANTING PLAN

DRAWN BY:	COD
DESIGNED BY:	JBR
DATE:	16APR07
JOB NO:	030737

DRAWING NO.

5

OF 5

APPENDIX B

PERMITS

INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
We make Indiana a cleaner, healthier place to live.

Mitchell E. Daniels, Jr.
Governor

Thomas W. Easterly
Commissioner

100 North Senate Avenue
Indianapolis, Indiana 46204
(317) 232-8603
(800) 451-6027
www.IN.gov/idem

March 14, 2007

VIA CERTIFIED MAIL 7002 0510 0003 8210 2131

Ms. Heather Harwood
Wawasee Area Conservation Foundation
P.O. Box 548
Syracuse, IN 46567

Dear Ms. Harwood:

Re: Section 401 Water Quality Certification
Project: WACF Bayshore Wetland Project
IDEM No.: 2006-540-43-EME-A
COE No.: LRE-2006-1430250
County: Kosciusko

Office of Water Quality staff has reviewed your application for an Individual Section 401 Water Quality Certification dated September 19, 2006, and received September 26, 2006. This office has also reviewed modifications to the original application dated November 2, 2006 (received November 8, 2006), January 24, 2007 (received January 29, 2007), and February 28, 2007 (received March 5, 2007). According to information received January 29, 2007, and March 5, 2007, you have minimized impacts and now propose to construct a 4,000 square foot earthen berm within the western (larger) open water pond, which was historically excavated in wetlands. You also propose to construct a 200 square foot rock spillway between the western pond and the smaller eastern open water pond which was also historically excavated in wetland. Total impacts below the Ordinary High Water Mark (OHWM) of the pond will be 1,506 cubic yards of rock over 4,200 square feet (0.096 acre).

You also propose to remove existing, historic fill from wetlands to the north of the eastern (smaller) open water pond and also from wetlands to the west of the western (larger) open water pond. The fill is proposed to be removed in a one step manner from equipment staged in uplands, and the spoils will be taken to an upland disposal location. The wetland areas will then be seeded and enhanced with native wetland species. The wetland enhancement is not offered as mitigation and no monitoring of the enhanced areas will be required. The purpose of the project is to encourage sedimentation within the existing ponds to improve water quality in Lake Wawasee, which is hydrologically connected to the ponds, adjacent wetlands, and an

adjacent tributary. The project is located southeast of the intersection of East Hatchery Road and CR 850 East (SE ¼ of Section 26, Township 34 North, Range 7 East), near Syracuse, Kosciusko County.

It is the judgment of this office, pending concurrence from the U.S. Army Corps of Engineers, that the aforementioned project will qualify for the U.S. Army Corps of Engineers' (Corps) Indiana Regional General Permit and meets the terms of all Section 401 Water Quality Certification conditions. Information on the Regional General Permit and IDEM's Section 401 Water Quality Certification Conditions can be found at:

http://www.in.gov/idem/programs/water/401/rgp02.html (RGP)

Water Quality Certification is, therefore, considered granted for this project. You will receive no further correspondence from this office regarding this project.

If you have additional questions or do not have access to the Internet, please contact Ms. Liz Elverson, Project Manager, of my staff at 317-233-2482, or you may contact the Office of Water Quality through the IDEM Environmental Helpline (1-800-451-6027).

Sincerely,

Marylou Poppa Renshaw, Chief
Watershed Planning Branch
Office of Water Quality

Enclosures: Modified Plans from J.F. New dated 2/28/07 (received 3/5/07)

cc: Ryan Cassidy, USACE-South Bend Field Office (w/enclosures)
John Richardson, J.F. New & Associates-Walkerton (w/enclosures)

DEPARTMENT OF THE ARMY
DETROIT DISTRICT, CORPS OF ENGINEERS
REGULATORY OFFICE
SOUTH BEND FIELD OFFICE
2422 VIRIDIAN DRIVE SUITE # 101
SOUTH BEND, INDIANA 46628

March 7, 2007

IN REPLY REFER TO
File No. LRE-2006-1430250

Heather Harwood
Wawasee Area Conservancy Foundation
PO Box 548
Syracuse, Indiana 46567-0548

Dear Ms. Harwood:

Please refer to your application dated September 22, 2006 for a Department of the Army permit to implement a water quality improvement project in wetlands adjacent to Lake Wawasee near southwest of the intersection of 850 East and Hatchery Road near Syracuse, Indiana (Section 26, Township 34N, Range 7E, Kosciusko County). *Please note that our file number format changed in January 2007 due a database update. Your old file number 06-143-025-0 is now recorded as LRE-2006-1430250.*

Under Section 10 of the Rivers and Harbors Act of 1899 and Section 404 of the Clean Water Act, Louisville and Detroit Districts reissued Regional Permit 99-100-003-1 on December 15, 2004 for certain activities having minimal impact in Indiana. We have verified that your proposed work shown on the enclosed plans and described below is authorized under the Regional Permit. You may proceed with the work subject to the enclosed general conditions, any noted special conditions, and Indiana Department of Environmental Management (IDEM) Section 401 Water Quality Certification.

The following work is authorized:

Discharge approximately 1500 cubic yards of clean earthen fill material into 0.09 acres of an open water area for the construction of a levee, and discharge approximately 66 cubic yards of riprap and clean earthen fill into approximately 0.06 acres of an open water area for the construction of three separate rock spillways.

Special Conditions:

1. This authorization is not valid until official receipt of the Indiana Department of Environmental Management (IDEM) Water Quality Certification.

2. The permittee shall adhere to the conditions specified by the Indiana Department of Environmental Management.

3. All fill shall consist of clean, inert materials from an upland source.

4. Install silt fence or other erosion control measures around the perimeter of any wetlands and/or other waterbodies to remain undisturbed at the project site.

5. You agree to successfully enhance wetlands and open water areas with additional native wetland plantings and native plant buffer areas per the plan submitted by JF New dated February 28, 2007, titled Bayshore Lare Project . The construction of the mitigation area must be completed within one year of the date of issuance of this permit.

    a. Implementation Plan.
        1. The wetland areas will be planted with an emergent wetland mix and wet-to-mesic Prairie/Meadow Seed Mix.
        2. The open water fringe will be planted with a native submerged and floating aquatic plant mix.
        3. The buffer planting will be planted with a native plant Slope Stabilization Mix.

    b. Monitoring plan.
        1. Monitoring will be required for one year.
        2. One year from the date of this permit, send photos which substantiate that the wetland enhancement and planting plan were successfully implemented.

Any construction activity other than that shown on the plans may not qualify for the Regional Permit. If you plan changes or additional activities from those depicted on the plans, please submit them to this office for review prior to construction.

Upon completion of the work authorized by this RGP, the enclosed Completion Report form must be completed and returned to this office. This verification is valid until December 15, 2009, or 1 year from the date of this letter, whichever occurs later, unless the regional permit is modified, suspended or revoked.

If you have questions, please contact me at the above address or telephone (574) 232-1952. Please refer to File Number: LRE-2006-1430250.

Sincerely,

ORIGINAL SIGNED BY

Ryan D. Cassidy
Project Manager
South Bend Field Office

Copies Furnished

IDEM/Elverson
IDNR/Division of Water
J.F. New/Richardson

GENERAL CONDITIONS:

1. Minimization/Avoidance: Discharges of dredged or fill material into waters of the United States must be minimized or avoided to the maximum extent practicable at the project site (i.e. on-site). In determining the minimal impact threshold, the Districts will consider the direct and secondary impacts of the fill or work and any mitigation measures. A wetland delineation report is also required.

2. Mitigation: The permittee shall provide a mitigation/monitoring plan for any activity where the adverse impact on special aquatic sites exceeds 0.10 acre (4,356 sq. ft.) or is determined to be more than minimal impact. The permittee shall also provide a mitigation/monitoring plan for any channelization, encapsulation, or relocation of greater than 300 linear feet of intermittent or perennial stream. All mitigation plans should include a minimum 50-foot wide buffer between the edge of the project site and the waters and/or wetlands to be affected unless a lesser distance has been specifically approved under the RGP. If mitigation is required, the permittee shall develop the mitigation site concurrently with site construction.

3. Soil Erosion and Sedimentation Controls: The permittee shall install sedimentation and soil erosion control measures prior to any construction activity, and maintain them in effective operating condition during construction. This shall include the installation of straw bale barriers, silt fencing and/or other approved methods to control sedimentation and erosion. The permittee shall immediately stabilize areas disturbed by any construction activity, including channel banks, and revegetated with a combination of grasses, legumes and shrubs compatible to the affected area.

4. Management of Water Flows: In-stream work during periods of high flows should be avoided. The activity must be designed to maintain preconstruction flow conditions to the maximum extent practicable. The activity must not permanently restrict or impede the passage of high flows (unless the primary purpose of the fill is to impound waters). The activity must, to the maximum extent practicable, reduce adverse effects such as flooding or erosion downstream and upstream of the project site.5. Waterfowl Breeding Areas: The discharge of dredged and/or fill material in known waterfowl breeding areas must be avoided to the maximum extent practicable.

6. Aquatic Life: The permittee shall not perform in-stream construction activity during the fish-spawning season between April 1 through June 30 without prior approval from the Districts. The Districts will coordinate with the Indiana Department of Natural Resources for their expertise on impacts to the fishery resource. The permittee will ensure that the activity authorized will not disrupt movement of those aquatic species indigenous to the waterbody, including those species which normally migrate through the area unless the activity's specific purpose is to impound water.

7. Equipment: All construction equipment shall be refueled and maintained on an upland site away from existing streams, drainageways and wetland areas. Heavy equipment working in wetlands must be placed on mats, or other measures taken to minimize soil disturbance.

8. Water Quality: The permittee must provide a copy of the site specific State Section 401 WQC before the Corps will authorize a project under the RGP.

9. Case-by-case conditions: The permittee must comply with any case specific special conditions added by the Corps or by the State Section 401 WQC. The conditions imposed in the State Section 401 WQC are also conditions of this RGP.

10. Navigation: The permittee shall assure that no activity authorized by the RGP may cause more than a minimal adverse effect on navigation.

11. Maintenance: Any structure or fill authorized by this RGP shall be properly maintained, including maintenance to ensure public safety.

12. Wild and Scenic Rivers: The permittee shall not perform any work within any Wild and Scenic Rivers or in any river officially designated as a "study river" for possible inclusion in the system, unless the appropriate Federal agency, with direct management responsibility for such river, has determined in writing that the proposed activity authorized by the RGP will not adversely affect the Wild and Scenic River designation or study status. Information on Wild and Scenic Rivers may be obtained from the appropriate Federal Land Management agency in the area (e.g. U.S. Forest Service, Bureau of Land Management or the U.S. Fish and Wildlife Service).

13. Endangered Species: The permittee shall not perform any work under the RGP which is likely to jeopardize the continued existence of a threatened or endangered species or a species proposed for such designation, as identified under the Federal Endangered Species Act, or which is likely to destroy or adversely modify the critical habitat of such species. The permittee shall notify the District Engineer if any listed species or critical habitat might be affected or is in the vicinity of the project, and shall not begin work under the RGP until notified by the District Engineer that the requirements of the Endangered Species Act have been satisfied and that the activity is authorized. Authorization of an activity under the RGP does not authorize the "take" of a threatened or endangered species as defined under the Federal Endangered Species Act. In the absence of separate authorization (e.g., an ESA Section 10 Permit, a Biological Opinion with "incidental take" provisions, etc.) from the U.S. Fish and Wildlife Service or the National Marine Fisheries Service, both lethal and non-lethal "takes" of protected species are in violation of the Endangered Species Act.

14. Historic Properties: The permittee shall not perform any activity under the RGP which may affect historic properties listed, or eligible for listing, in the National Register of Historic Places until the District Engineer has complied with the provisions of 33 CFR Part 325, Appendix C. The permittee must notify the District Engineer if the activity authorized by the RGP may affect any historic properties listed, determined to be eligible or which the permittee has reason to believe may be eligible for listing on the National Register of Historic Places, and shall not begin construction until notified by the District Engineer that the requirements of the National Historic Preservation Act have been satisfied and that the activity is authorized. Information on the location and existence of historic resources can be obtained from the Indiana Department of Natural Resources, Division of Historic Preservation and Archaeology.

If the permittee discovers any previously unknown historic or archaeological remains while accomplishing the activity authorized by the RGP, work must be immediately stopped and this office immediately notified of what you have found. The District will initiate the Federal, tribal and State coordination required to determine if the remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

15. Water Supply Intakes: The permittee shall not perform any work under the RGP where the discharge of dredged and/or fill material would occur in the proximity of a public water supply intake except where the activity is for the repair of the public water supply structure or adjacent bank stabilization.

16. Suitable Materials: No activity, including structures and work in waters of the United States or discharges of dredged or fill material may consist of unsuitable materials (e.g. trash, debris, car bodies, asphalt, etc.) and that materials used for construction or discharge must be free from toxic pollutants in toxic amounts.

17. Impoundments: The permittee shall ensure that if the activity approved by the RGP includes impoundment of water, measures will be taken to minimize adverse effects on the aquatic ecosystem caused by the accelerated passage of water and/or the restriction of flow.

18. Removal of Temporary Fills: The permittee shall ensure that all temporary fills, authorized under the RGP, be removed in their entirety and the affected areas returned to pre-construction elevation.

19. Access: Representatives from the Corps of Engineers and/or IDEM may inspect any authorized activity or mitigation site at any time deemed necessary to ensure compliance with the terms and conditions of the RGP, Section 401 WQC, and applicable laws.20. Construction Period: All work authorized by this RGP must be completed by the expiration date of this RGP or 1 year after the date of the Corps authorization letter, whichever occurs later. If you find you need more time to complete the authorized activity, submit your request for a time extension to this office for consideration at least 3 months before the expiration date.

21. Reporting: The permittee after completion of work under the RGP shall submit a signed certification letter regarding the completed work and required mitigation, if applicable. The certification letter will include a statement that the work was done in accordance with the RGP authorization including compliance with all general and special conditions and completion of mitigation work.

PERMIT COMPLETION REPORT

Detroit District, Corps of Engineers

CELRE-RG-A-S LRE-2006-1430250

Commander
U.S. Army Engineer District, Detroit
ATTN: Regulatory Office
P.O. Box 1027
Detroit, Michigan 48231-1027

Dear Sir:

This is in regard to Department of the Army File No. LRE-2006-1430250, issued to Wawasee Area Conservancy Foundation on March 7, 2007, for the discharge of fill associated with the implementation of a water quality improvement project near Syracuse, Indiana. I hereby certify that the work authorized by the above referenced permit has been completed in accordance with the terms and conditions of the permit, and mitigation (if required) was completed in accordance with the permit conditions.

The work was completed on: _____
(Date work completed)

_____
(Signature of Permittee) (Date)

Upon completion of the activity authorized by this permit and any mitigation required by the permit, sign this certification and return it to the above address, within 10 days after completion of work.

Please note that your permitted activity is subject to compliance inspection by the U.S. Army Corps of Engineers' representatives. If you fail to comply with this permit you are subject to permit suspension, modification or revocation.